MC Electron Response

Simulation Group Meeting

March 10, 2005

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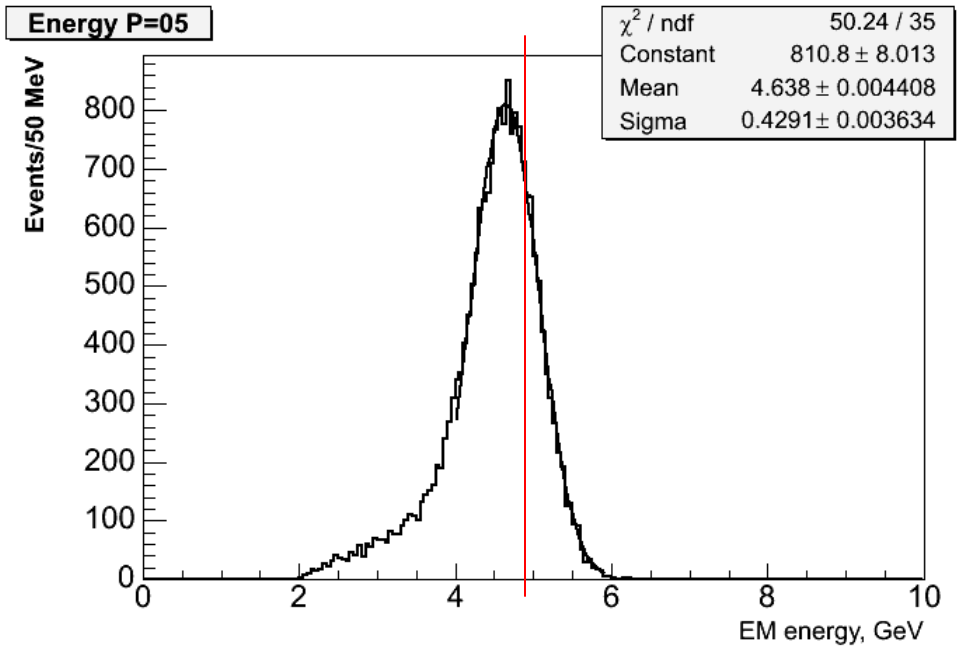
- Energy Scan

  fake events (cdfSim+Production+EM Rec.)

  - 5,10,20,40,80,160,320 GeV 30k each
  - central region only (|eta|<1)
  - flat in eta, phi
- Future Plans

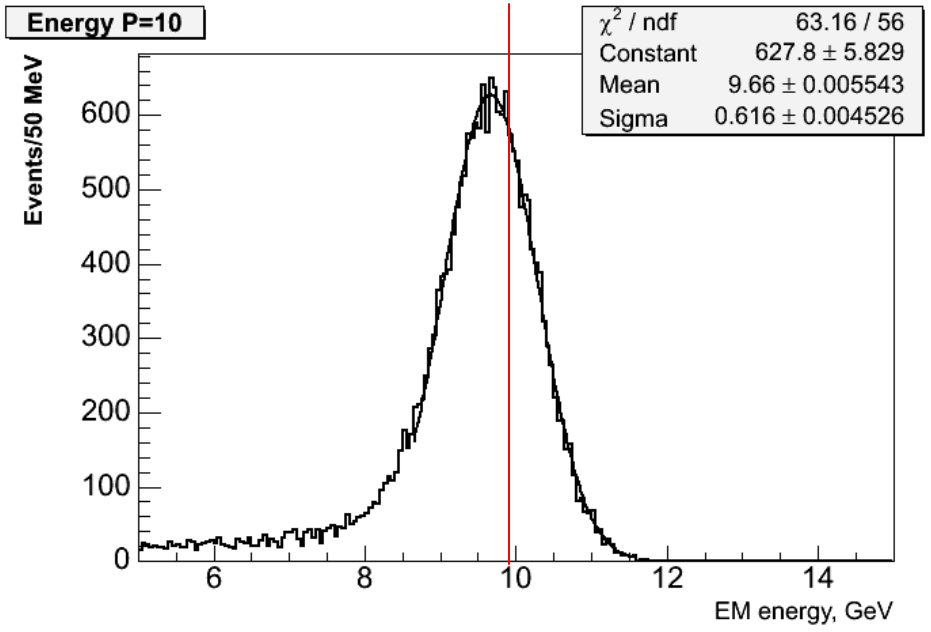
EM energy vs Input

P=5 GeV



Peak=4.64 GeV

P=10 GeV

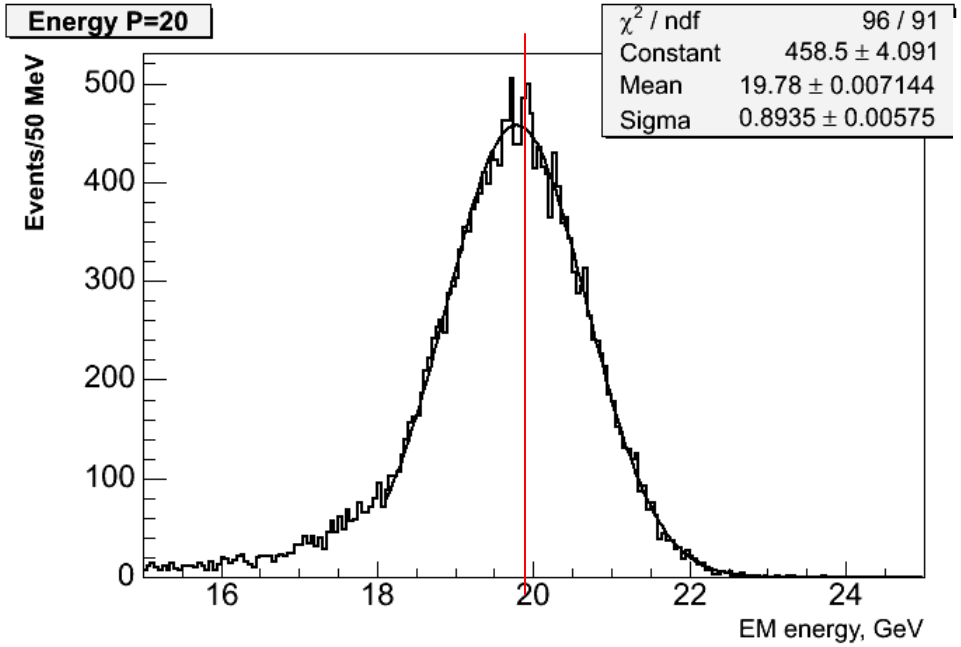


Peak=9.66 GeV

Gaussian fit ($-1.5*\sigma < \text{mass} < 3.0*\sigma$)

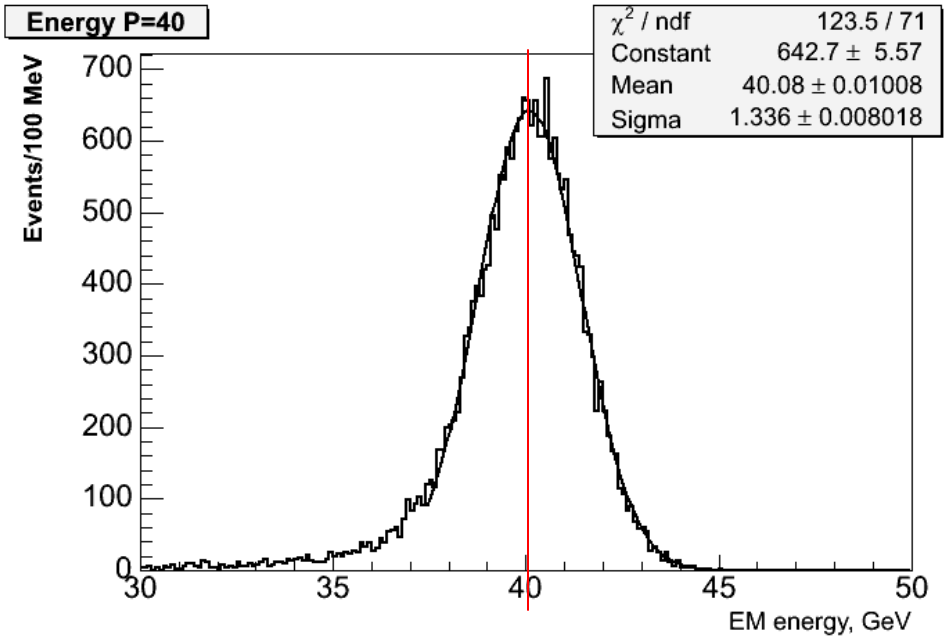
Input P vs. EM energy

P=20 GeV



Peak=19.78 GeV

P=40 GeV

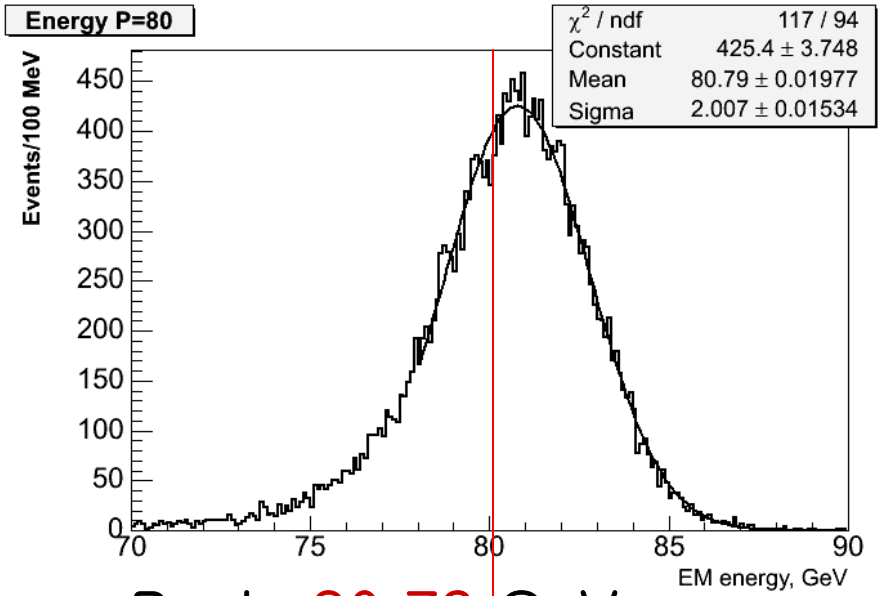


Peak=40.08 GeV

W/Z decay electrons

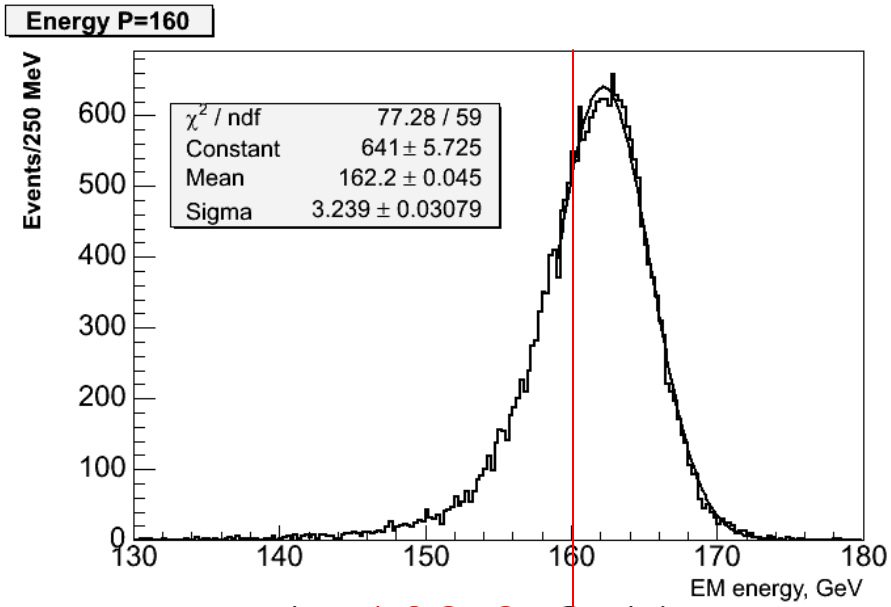
Gaussian fit ($-1.5*\sigma <$ mass $< 3.0*\sigma$)

P=80 GeV



Peak=80.79 GeV

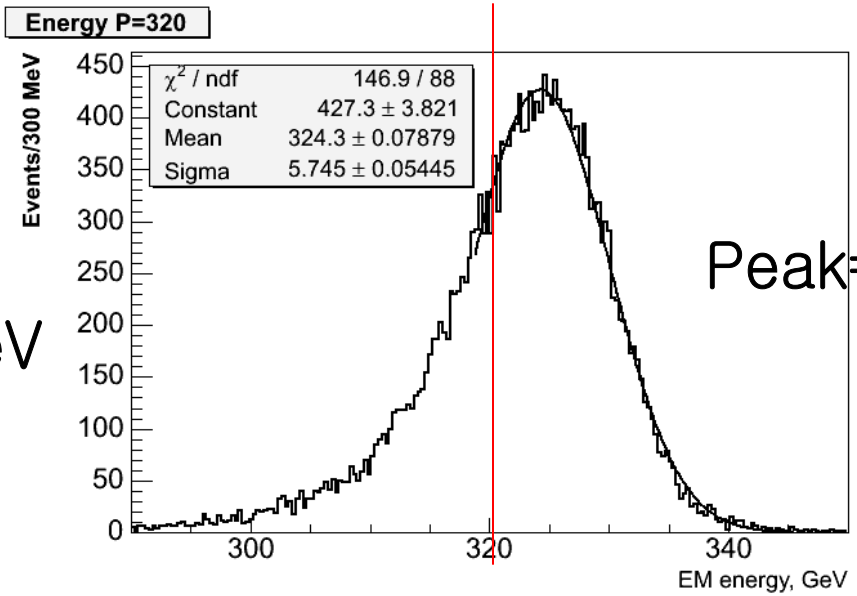
P=160 GeV



Peak=162.2 GeV

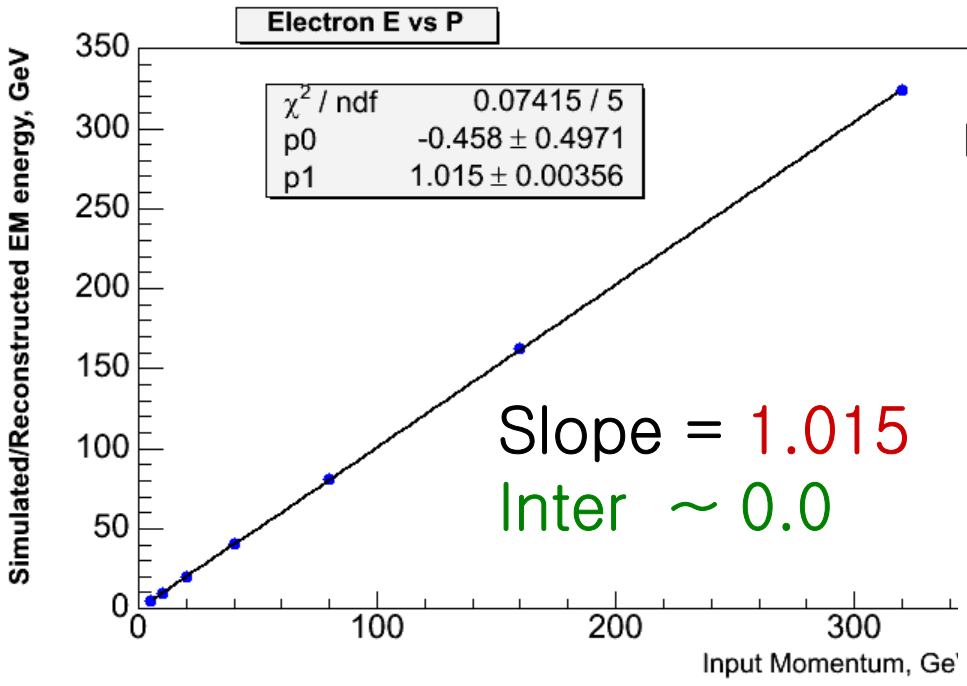
Gaussian fit
(−1.0*σ< mass < 3.0*σ)

P=320 GeV

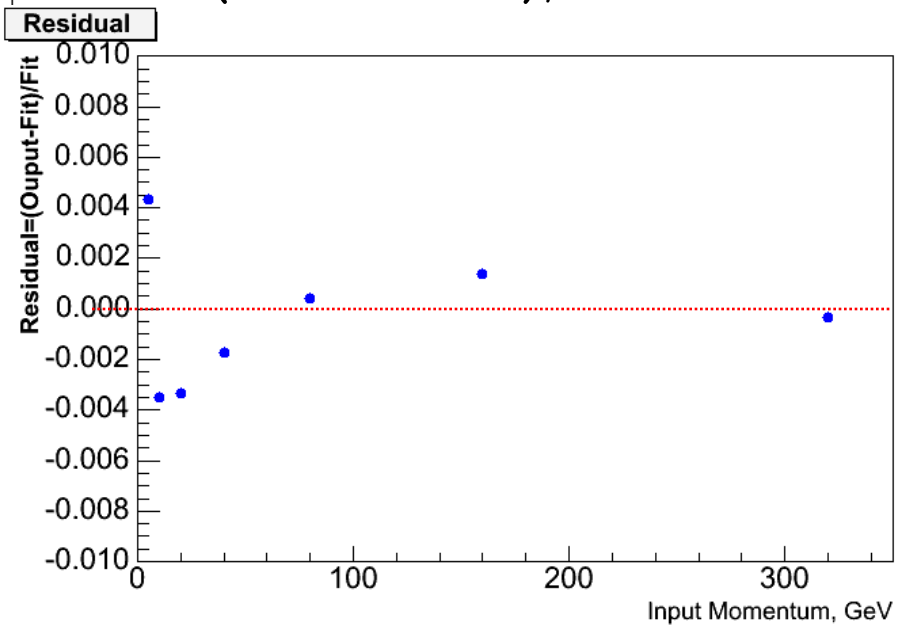


Peak=324.3 GeV

Input (p) vs. Output (energy)



Residual =
(EM E.−Fit)/Fit



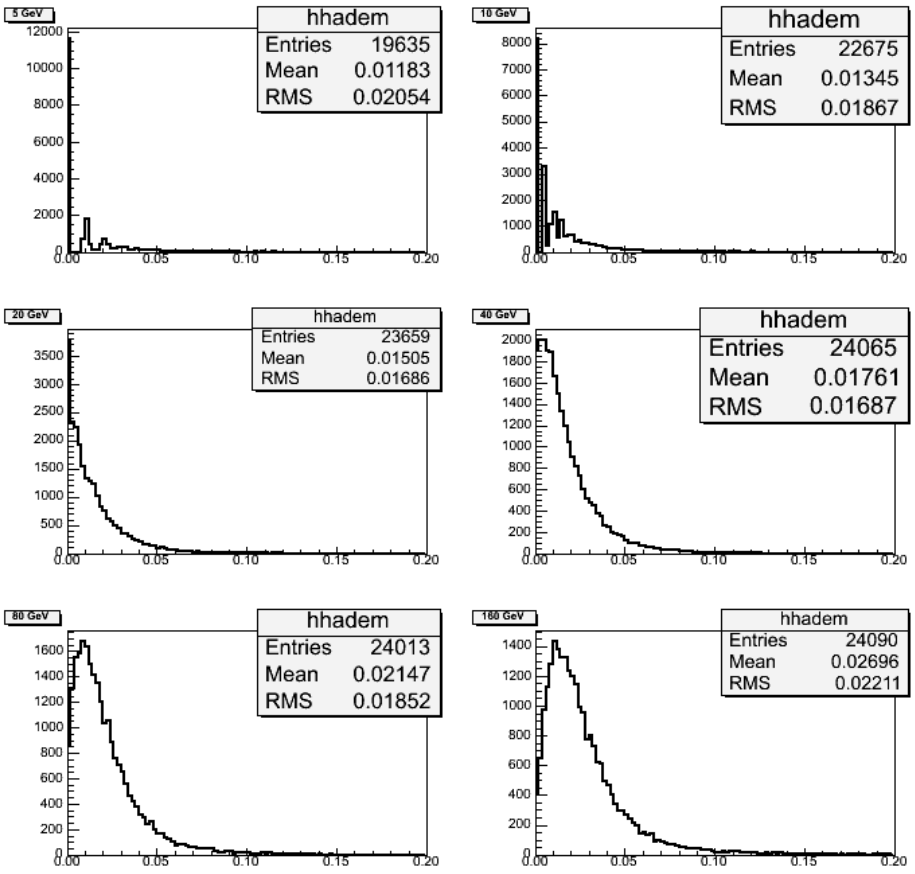
Any good idea?

Tower response, Leakage to HCAL

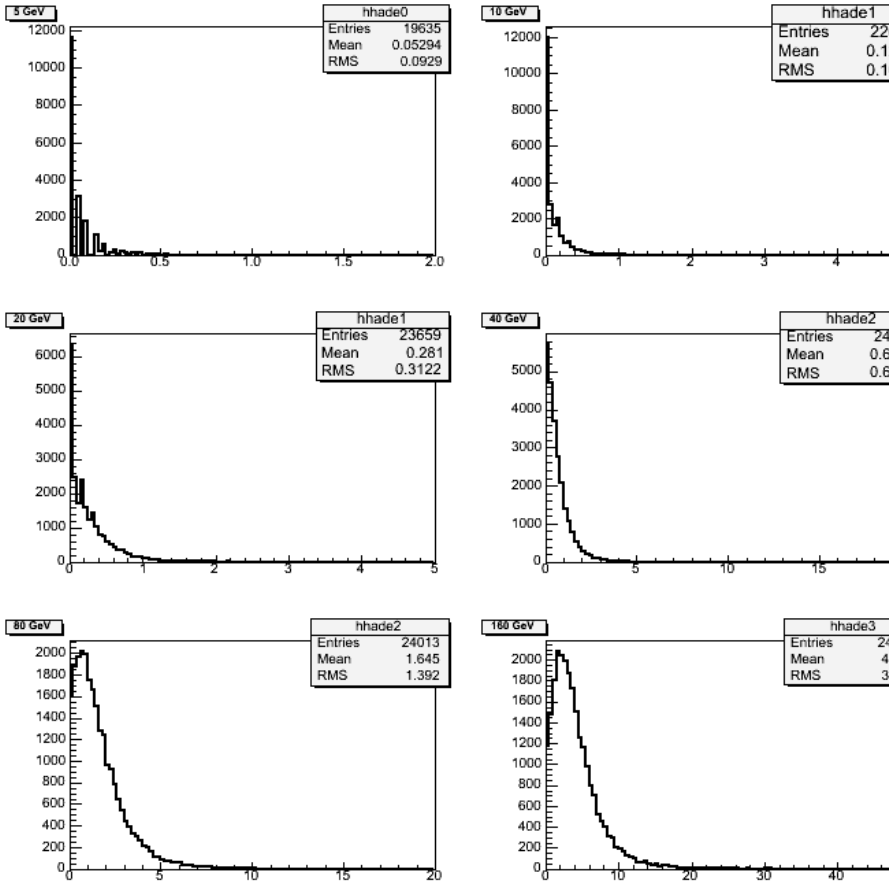
Map Correction(lateral profile), Adc2GeV

Energy in the HCAL

Had/Em



E in HCAL

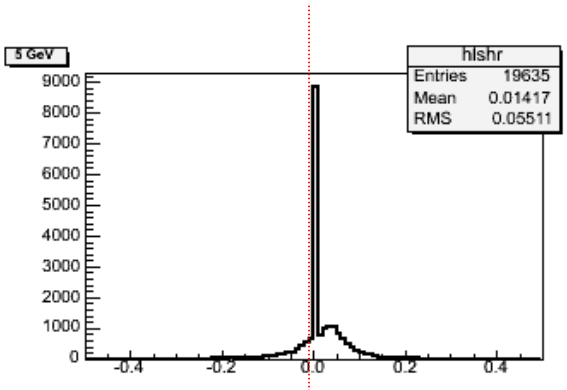


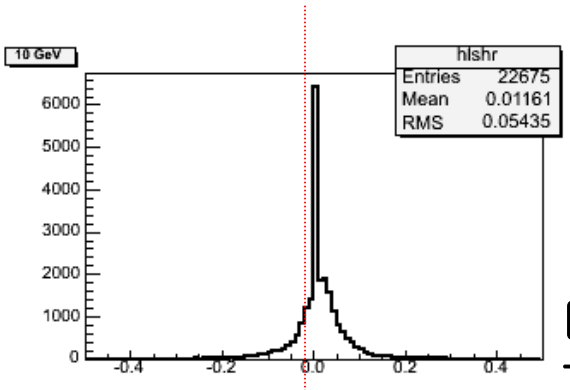
Leakage correction is correctly done?

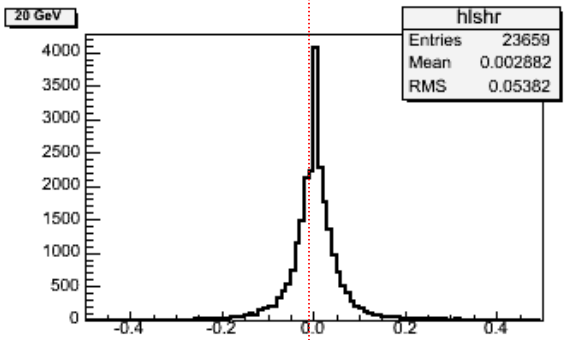
(EM response+LC → EM energy)

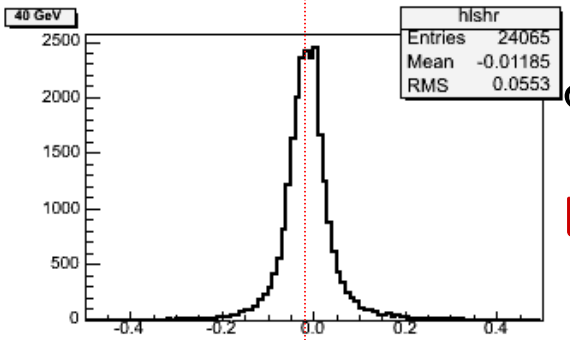
Data vs. MC : agreement is not good

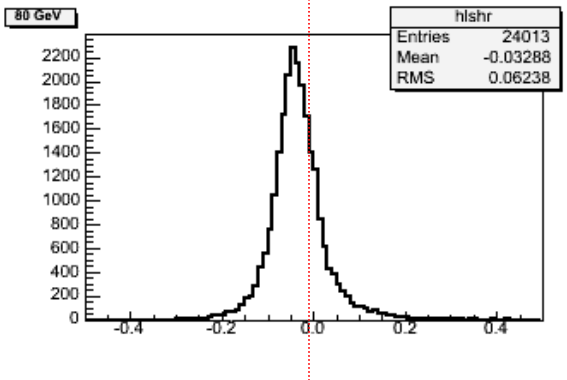
LShr = $0.14*\Sigma(E_i-T_i)/\sigma$

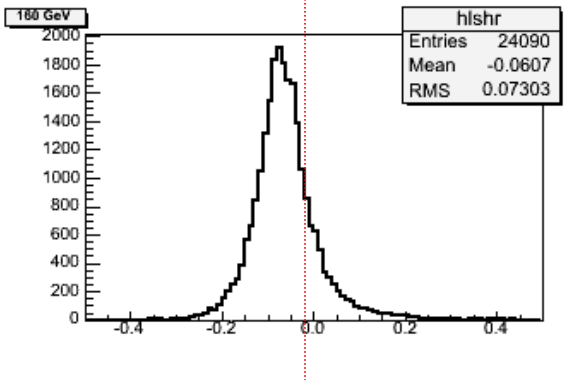












Ei= energy in Adjacent towers
Ti = predicted (testbeam)
measured z from CES
σ= error on (Ei−Ti)

Lateral Profile ?

Discussion and Plans

- Scanned Electron Energy (P=5-320GeV)
  - less EM energy for P<40 GeV
  - more EM energy for P>40 GeV
  - Slope is 1.015 (not 1.00)
- Energy in HCAL is not well described
- LShr (Lateral Profile) shows energy dependence

Plans :

- Check Lateral Profiles (eta, Phi, crack dependence) (Map corrections, LShr, and ...)
- Understand Leakage E correction to EM
- HCAL response (Had/Em)
- Materials
- others